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A Manual
Home Mechanics for
Wartime Living

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State Council of Defense
(Pa.)
A Manual

A MANUAL

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**Home Mechanics
for
Wartime Living**

**State Council of Defense
Commonwealth of Pennsylvania
State Capitol, Harrisburg**

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A MANUAL



Home Mechanics
for
Wartime Living



State Council of Defense
Commonwealth of Pennsylvania
State Capitol, Harrisburg

It is the aim and objective of this administration to do everything to promote the war effort in Pennsylvania. We believe the Consumer Interest Program a splendid set-up because it encourages people to make economical use of wartime goods and services. As Governor of Pennsylvania I recommend that wherever possible all existing material and household equipment should be conserved for the duration of the war.

With appreciation for the efforts of the Staff of the Council of Defense towards this accomplishment and earnestly soliciting the cooperation of the people with the Staff, I am

A handwritten signature in dark ink, appearing to read "Frank McNair". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Governor of the Commonwealth
of Pennsylvania.

America has one great lesson to learn—the complete appropriation and maximum use of existing facilities. Our history has been one of expansion or acquisition whenever a need has appeared. To an amazing degree our commercial structure has encouraged the habit of discarding slightly used equipment and purchasing new. Commercial advertising has constituted a powerful propaganda toward the discard and disregard of anything already in use and the meeting of exigencies by the opening of new areas and the acquisition of new equipment.

There are always some compensations in war, destructive as it may be otherwise. One compensation in this case will be evident if America will reverse the old procedure and learn the methods of one hundred per cent appropriation of the facilities which are right at hand.

This is true in the home as well as in the greater areas of commercial and economic life. We have yet to learn what might be done with the houses in which we are now living and what amazing results can be achieved with the furnishings and equipment which are already in those homes. The substitution of ingenuity and hard work for the proverbial flight to the corner store will be a revolution of inestimable value in the economics of America.

This course is timely, therefore, not only because of practical values but more because it will be helpful in checking the habit of wastefulness of which we have heretofore been so proud and in substituting the practice of using that which we now possess.

A handwritten signature in dark ink, appearing to read "Paul H. Nitze", written in a cursive style.

Executive Director,
State Council of Defense.

FOREWORD

Since, in these days of war, houses, their furnishings and equipment are irreplaceable and labor is short for repairs, the Advisory Committee on Consumer Interests of the State Council of Defense has prepared this informal course for the citizens of Pennsylvania. It is hoped that information and skills obtained through this course will enable householders to keep things in good condition while the war lasts, thus contributing substantially to maintenance of good morale and health. Although many women will take these lessons, probably many men will profit from them also, to round out and brush up on their skills.

We are indebted to Mr. R. U. Blasingame, Head of The Department of Agricultural Engineering, The Pennsylvania State College, who as a member of our Advisory Committee on Consumer Interests took the initiative at the request of the Committee in preparing this course. We are grateful also to Mrs. Anna G. Green, Chief, Home Economics Education, Department of Public Instruction; Mr. H. C. Fetterolf, Chief of Agricultural Education, Department of Public Instruction; and Mr. Chas. F. Zinn, Chief of Industrial Education, Department of Public Instruction who reviewed the manuscript and made constructive suggestions. To these people and to the officials of the State Council of Defense, goes our sincere gratitude for the time, thought and effort given to the production of another aid for Consumers' war-time living.

HELEN KINGSBURY ZIRKLE,
*Chairman Advisory Committee
on Consumer Interests*



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HOME MECHANICS FOR WARTIME LIVING

By D. C. SPRAGUE and R. U. BLASINGAME

Introduction

The following outline has been prepared at the request of the Advisory Committee on Consumer Interests, Pennsylvania State Council of Defense. In these wartimes, much household equipment is irreplaceable and repair men are scarce. Therefore, in the interests of civilian efficiency, these lessons are offered.

Because school industrial arts or vocational agriculture shops are already supplied with the necessary tools it is suggested that this course be given in the schools and by their instructors. Consumer Chairmen or other group leaders wishing to schedule the course should make local arrangements with the schools having such shops and facilities. If, however, no school shops are accessible, it is recommended that groups desiring this course shall use their ingenuity in getting the help and cooperation of local repairmen—their services both as instructors and lenders of equipment.

The Advisory Committee on Consumer Interests, State Council of Defense, will be glad to give a certificate to those completing eight of the fifteen lessons if the names are sent in by the County Consumer Chairman.

The course provides:

(a) An understanding of the mechanics of the operation of home equipment necessary to its maintenance.

(b) The development of judgment in the use, storage and servicing of such equipment.

(c) The developing of skill in the use of tools necessary for making simple adjustments and repairs on this equipment.

(d) This household equipment includes the following:

I. Electric equipment—(a) heating appliances and cords, (b) lighting fixtures, floor lamps and cords, (c) miscellaneous motors, (d) wiring system fuses, switches and convenience outlets.

II. Machines—(a) sewing machines, (b) mixers and sweepers, (c) refrigerators, (d) lawn mowers, (e) furnace stokers, oil burners and draft controls.

III. Hand tools — (a) kitchen knives, (b) lawn shears and sickles, (c) garden hoe.

IV. Plumbing equipment — (a) faucets, (b) flush tank parts, (c) drains, (d) garden hose.

V. Building equipment — (a) storm sash and screens, (b) floors, woodwork and walls.

VI. Miscellaneous equipment — (a) furniture, (b) children's play equipment.

Organization

The course is set up on a basis of 30 hours of instruction. This may be divided into 15 periods of 2 hours each, or 10 periods of 3 hours each. From $\frac{1}{4}$ to $\frac{1}{3}$ of this time is to be devoted to demonstration and discussion with the remaining time spent in actual practice of the skills and techniques involved. Discussions and demonstrations may be held at any time during a class meeting.

The course may be held satisfactorily in school industrial arts or vocational agriculture shops large enough to accommodate the size class expected. Classroom space or

seats should also be provided for use during discussions.

The tools generally found in the shops will ordinarily be ample. *The minimum tool requirements are listed in the outline.*

Household equipment, such as sewing machines, appliance cords, motors, kitchen knives, scissors, lawn and garden tools, is to be provided by members of the class. An announcement at each class meeting is to be made of the equipment to be provided by the class members at the next meeting. Certain equipment, such as faucets, flush tank parts, sink traps, fuse boxes, wornout convenience outlets and switches, may be difficult to provide in the school shop. In such case, the class can be taken to a home for this work. However, it is recommended that equipment be purchased or borrowed so that practice can be provided for each member of the class in the school shop. For the instruction to be most effective, the class members must be allowed actually to do the jobs rather than to stop after seeing a demonstration.

Cost of Course

Supplies, such as lumber, glue, nails, screws, putty, stain, and paint should be provided as indicated in the outline. These supplies will cost probably about \$1. per person for the course. It is assumed that tools will be loaned by the schools or shops, and that instruction will be given by volunteers who will contribute their time to this phase of the civilian protection.

Course Outline

The chart, "Suggested Outline for Home Mechanics Course and Schedule for 15 Two-Hour Meetings," indicates the subjects to be included and makes suggestions as to jobs, the completion of which will develop the abilities and skills to handle the subjects indicated. However, jobs other than those listed may be included. The chart also

indicates the tools and supplies required for the various jobs and the equipment that is to be provided by the class members. Also, following the chart, the instruction for each class meeting has been outlined.

#1. *Use of hand woodworking tools.* Measuring and laying out with the rule; making inside measurements with two sticks as for a curtain roller; use of the square in marking a board for sawing; sawing with the hand cross cut saw; sawing with the hand rip saw; boring holes with the brace and bits; drilling holes with the hand drill or spiral ratchet screw driver and drill points in setting screws; the use of the screw driver and how to set a screw; driving and pulling nails with the claw hammer; the adjustment of the plane. The use of these tools will be brought out in making devices, such as a broom holder.

#2. *Conditioning household tools.* Joining, grinding to the proper bevel, and whetting smooth edge tools, such as butcher and paring knives and planes; the use of the steel; grinding and filing scissors and adjusting for shear cut.

#3. *Conditioning lawn and garden tools.* Cleaning and lubricating the lawn mower; how to whet a sickle; grinding hedge and grass shears; replacing broken handles in hoes, shovels and the like.

#4. *Reinforcing wood frames.* Types of hardware available for reinforcing sash and doors, including the common kinds and sizes of nails; types of wood joints; how to cut a miter.

#5. *Painting and glazing.* Solvents for cleaning paint brushes; storing a brush for short periods of time by suspending in linseed oil; storing a brush for long periods of time by thoroughly cleaning and wrapping in paper; how to measure for and cut glass; priming the surface; driving Glazier's points; applying putty; painting wood parts of window and screens; painting screen wire.

#6. *Repair of plumbing equipment.* Cost of cold and hot water wasted by leaking faucets; the effects of leaking faucets upon the septic tanks; cleaning the sink; cleaning and preventing stopped traps and drains; selection and replacing of faucet washers; packing valve stems with candlewicking and lubricating with vaseline; replacing flush tank washer; adjusting flush tank mechanism; checking flush tank float for leaks.

#7. *Maintaining electric wiring.* The causes for blown fuses; the effects of voltage drop caused by overloads on the efficiency of appliances, such as toasters, flat irons, and lights; how poor splices and connections cause voltage drop, and the effect upon efficiency of appliances; how to properly make connections; how to properly make splices; solder, and insulate them.

#8. *Repair and care of heating appliances.* Proper repair of heater cord by cutting away frayed end, whipping asbestos insulation in place and connecting to binding screws; how to bend the plug cap prongs to make better contact; clean heating appliances, such as sandwich toasters and waffle irons; polishing surfaces and reflectors.

#9. *Servicing small motor appliances.* The kind of lubricant to use for sleeve and ball bearings; how to clean an armature with sand paper; replacing brushes; adjusting tension on brush springs; cleaning the refrigerator condenser; adjusting belt tensions; the use of thermo cutout switches and slow acting fuses.

#10. *Conditioning lamps and fixtures.* The principles of good lighting; how to convert the old style

floor and table lamps into the indirect type, using diffusion bowls; selecting efficient lamp shades; painting the inside of dark colored shades with white shoe polish to make them more efficient; the use of silvered lamps and diffusion devices for ceiling and other lamps which give glare.

#11. *Sewing machine adjustment and care.* How to properly clean and lubricate a sewing machine; the adjustment of the upper and lower tensions and length of stitch for various work.

#12. *Furniture repair and maintenance.* Selecting glue; wedging and glueing joints. Repair of scratches of various finishes; how to stain, fill, and wax finish closed grain wood; how to dust and wash furniture; the use of furniture oil and wax; how to remove white spots caused by hot dishes.

#13. *Floor, woodwork and wall refinishing and care.* How to care for hardwood floors; how to repair worn or stained sections of floor; the use of oil paint, enamels and cold water paints.

#14. *Repairing items made of sheet metal.* How to drill metal; how to rivet; how to prepare work for soldering; how to prepare the soldering copper for use; applying the solder.

#15. *Operation and care of the house heating system.* Importance of cleaning the furnace and methods of keeping heating surfaces clean; methods of hand firing; regulation of drafts; care of the heating system during the summer; preparation of the heating system for freezing weather when not in use.

R. U. BLASINGAME.

SUGGESTED OUTLINE FOR HOME MECHANICS COURSE AND SCHEDULE FOR 15 TWO-HOUR MEETINGS

(If number of tools are limited, several jobs, each requiring different tools, may be scheduled concurrently)

Class meeting	Subject for discussion and demonstration 30-45 minutes	Practicum 75-90 minutes	Tools and supplies required (School shop)	Remarks relative to organization and equipment to be provided by class members
1	Use of hand woodworking tools.	Job. 1. Make a broom holder or snow shovel or garden tool rack.	Common woodworking tools and vises. 3 pieces 1"x4"x12' W. P. S4S 40 wood screws No. 9x1½" F. H. B.	Each person to complete this or a similar job.
2	Sharpening and repairing household tools.	Job 2. Sharpen kitchen knives, scissors, planes, etc.	Emery wheel, oil stone and oil, steel, whetstone, and 10" flat mill file, knife steel.	1 kitchen knife, 1 pair scissors, 1 plane iron or chisel per person (maximum).
3	Sharpening and repairing lawn and garden tools.	Job 3. Sharpen sickels, hedge or grass shears, hoes, shovels, and replace broken handles.	Tools required for Jobs 1 and 2. Adjustable end wrench. Machinist's vise, cold chisel and punch set. Machinist's hammer.	1 sickle for each 2 persons, 1 shear for each 2 persons, 1 hoe or shovel and new handle for each 4 persons (maximum).
4	Reinforcing wood frames.	Job 4. Make miter joints with nails and corrugated fasteners. Job 5. Reenforce screen, door or window frame with corrugated fasteners or corner braces.	Tools for Job. 1 40 linear feet of 1"x1½" W. P. miter box, 1 lb. 8d finishing nails. 4 doz. ⅜" corrugated fasteners.	One broken frame, such as window screen or door, or storm sash or door for each 2 persons and hardware. (Windows with broken glass may be glazed and painted during future meetings).
5	Painting and glazing.	Job. 6. Clean a paint brush. Job 7. Cut glass (Scrap). Job 8. Replace glass in window. Job 9. Paint storm sash and screens.	1 bar laundry soap, 1 qt. paint brush cleaner, 1 qt. linseed oil, 1 qt. turpentine, 1 qt. outside white paint, 1 pt. screen wire enamel, 1 lb. putty, rags, glass cutter, putty knife, Glazier's points, scrap glass, 2" paint brush.	1 "old" paint brush per person. 1 door or window screen for each 2 persons. 1 window to be glazed and painted and the necessary glass to each 4 persons.
6	Repair of plumbing equipment.	Job 10. Replace faucet washers and repack stem. Job 11. Replace washer in flush tank and adjust valve.	Assortment of faucet washers. Candle wicking, vaseline, flush tank washer, screw driver 5", monkey wrench, pliers, compression faucets and flush tank, and trap.	Class may be held in class member's home in which faucets are in need of attention. (May combine subject with meeting 7, using extra time for completion of previous or extra jobs).

7	Repairing electric wiring—Part I.	<p>Job 12. Test for replacing a blown fuse.</p> <p>Job 13. Check load on a circuit.</p> <p>Job 14. Replace or repair switch or receptacle which is broken or gets hot.</p>	<p>Weather proof socket and lamp bulb for test lamp. Fuses, blown and good. Single pole flush switch and convenience outlet to remove and replace.</p>	<p>Class may be held in class member's home if regular school fuse box is not accessible. (May combine subject with 6 using extra time for completion of jobs). Stress what not to do—underwriters regulations.</p>
8	Repairing electric wiring—Part II.	<p>Job 15. Assemble extension or drop cord.</p> <p>Job 16. Make splice complete with solder and tape.</p> <p>Job 17. Repair a heater cord.</p>	<p>Jack knife. 4" electrician's screw driver, side cutting plier, rosin core solder, candle, friction tape, rubber tape, thread, 10 ft. of 2 wire cord, plug and socket.</p>	<p>1 damaged heater cord (iron, toaster, etc.) per person and new plugs and sockets if needed. Other cords in need of repair.</p>
9	Servicing small electric appliances.	<p>Job 18. Clean and lubricate a fan, vacuum sweeper, mixer or other device.</p> <p>Job 19. Replace motor brushes and clean commutator.</p> <p>Job 20. Repair cords.</p>	<p>Rags, oil for sleeve bearings, grease for ball bearings, brush, tire pump or bellows, screw driver, 4" electrician's; screw driver, 5" machinist's; adjustable end wrench. 00 sand paper.</p>	<p>1 motor appliance such as vacuum sweeper for each member of class.</p>
10	Modernizing lamps and fixtures.	<p>Job 21. Convert old style lamps to indirect type.</p>	<p>Screw driver, plier, jack knife, hack saw, $\frac{1}{8}$" and $\frac{1}{4}$" pipe thread tap and die.</p>	<p>1 floor, table or bridge lamp to be converted, and necessary conversion socket and bowl to every 4 members of class. Unfinished work to be completed at home.</p>
11	Sewing machine adjustment and care.	<p>Job 22. Clean and lubricate a sewing machine.</p> <p>Job 23. Adjust upper and lower tension to give lock stitch.</p>	<p>Cleaning rags, shallow pan, clean paint brush, 1 gal. cleaning solvent, sewing machine oil, sewing cloth and thread. Small screw driver, electrician's screw driver, machinist's screw driver 5".</p>	<p>1 sewing machine and instruction book for every 2 persons.</p>
12	Furniture repair and maintenance.	<p>Job 24. Re-glue joints.</p> <p>Job 25. Repair scratches.</p> <p>Job 26. Surface stain, fill and wax a piece of closed grained wood, such as poplar.</p>	<p>1 pt. of boiled linseed oil, 1 pt. of turpentine. Nos. 0 and 00 sandpaper, stain, 1 pt. paste filler, 1 pt. white shellac, 1 pt. alcohol, 1" shellac brush, $\frac{1}{2}$ pt. glue, tools for Job 1. Rope for forcing legs of chair in place.</p>	<p>For jobs 24 and 25. 1 piece of furniture needing repair, such as diningroom chair to every 4 members of class. For Job 26. Two persons work together on 1 piece. Complete Jobs 25 and 26 during period 13.</p>
13	Floor, woodwork and wall refinishing and care.	<p>Job 27. Surface, fill, shellac and wax a piece of oak flooring.</p> <p>Job 28. Paint a piece of wood with semi-gloss paint.</p> <p>Job 29. Paint a piece of wood with undercoat and enamel.</p> <p>Job 30. Paint a piece of wood with cold water Casein paint.</p>	<p>$\frac{1}{2}$ pt. enamel undercoat, $\frac{1}{2}$ pt. enamel, 1 qt. Casein cold water paint.</p>	<p>Jobs 27, 28, 29 and 30 done by 2 persons working together. Begin jobs and do first steps during period 12, complete during period 14.</p>

SUGGESTED OUTLINE FOR HOME MECHANICS COURSE—Concluded

Class meeting	Subject for discussion and demonstration, 30-45 minutes	Practicum 75-90 minutes	Tools and supplies required (School shop)	Remarks relative to organization and equipment to be provided by class members
14	Repairing pans, etc.	Job 31. Drill hole through 2 pieces of scrap metal and rivet together. Job 32. Solder hole in tin can. Job 33. Sweat on a patch.	Hand drill and twist drill, tinner's rivets, hammer, soldering, copper and source of heat, acid core solder, sandpaper or emery cloth.	Complete Jobs 27-33. Last work period.
15	Operation and care of the house heating system.	Inspection trip. Technical instruction, principles of operation, how to regulate, etc. Dangers, and how to avoid them. (Economy in firing).		Arrange for several types of heating systems to be visited.



